Complete Summary

GUIDELINE TITLE

Essential hypertension.

BIBLIOGRAPHIC SOURCE(S)

University of Michigan Health System. Essential hypertension. Ann Arbor (MI): University of Michigan Health System; 2002 Aug. 14 p. [7 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Essential hypertension

GUIDELINE CATEGORY

Diagnosis
Management
Risk Assessment
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To accurately diagnose hypertension
- To improve blood pressure (BP) control
- To decrease hypertension-related morbidity and mortality
- To encourage patient´s self-involvement
- To provide appropriate education and follow-up
- To provide cost-effective care

TARGET POPULATION

Adults age 18 and older (non-pregnant)

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis and Initial Evaluation

1. Blood pressure measurement (office, home blood pressure monitoring, ambulatory blood pressure monitoring)
2. History and physical examination
3. Laboratory tests and diagnostic procedures (e.g., potassium, blood glucose, creatinine, calcium, urinalysis, lipid panel, electrocardiogram)
4. Other testing and/or referral for secondary hypertension or complicated hypertension
5. Risk stratification

Treatment/Management

1. Lifestyle modifications
    - Stress reduction
    - Dietary changes
    - Weight reduction and maintenance
    - Adequate physical activity
    - Tobacco avoidance
    - Moderate alcohol intake
2. Drug therapy
    - Angiotensin converting enzyme (ACE) inhibitors such as captopril (generic and Capoten), enalapril (generic and Vasotec), lisinopril (Prinivil/Zestril), quinapril (Accupril), moexipril (Univasc), benazepril (Lotensin), ramipril (Altace), trandolapril (Mavik), fosinopril (Monopril), perindopril (Aceon)
    - Angiotensin II receptor antagonists (ARB) such as valsartan (Diovan), losartan (Cozaar), candesartan (Atacand), eprosartan (Teveten), irbesartan (Avapro), telmisartan (Micardis), olmesartan (Benicar)
    - Beta blockers such as atenolol (generic and Tenormin), metoprolol tartrate, propranolol (generic and Inderal), nadolol (generic and Corgard), metoprolol succinate (Toprol XL), metoprolol tartrate (Lopressor), labetalol (generic and Trandate/Normodyne)
    - Calcium channel blockers such as diltiazem, diltiazem CD, nifedipine CC, amlodipine, verapamil SR, nisoldipine (Sular), felodipine (Plendil), isradipine (DynaCirc), isradipine CR (DynaCirc CR)

- Calcium channel blocker/ACE inhibitor combinations such as amlodipine/benazepril (Lotrel), trandolapril/verapamil (Tarka)
- Thiazide diuretics such as hydrochlorothiazide (HCTZ) and chlorthalidone
- Potassium sparing/thiazide combination diuretics such as amiloride/HCTZ, spironolactone/HCTZ, triamterene/HCTZ
- ACE inhibitor/diuretic combinations such as lisinopril/HCTZ (Prinzide/Zestoretic), benazepril/HCTZ (Lotensin HCT), fosinopril/HCTZ (Monopril HCT), quinapril/HCTZ (Accuretic)
- Angiotensin receptor blocker/diuretic combinations, such as losartan/HCTZ (Hyzaar), valsartan/HCTZ (Diovan HCT)
- Other diuretics such as furosemide

3. Monitoring blood pressure control (home blood pressure monitoring) and follow-up

MAJOR OUTCOMES CONSIDERED

- Reductions in blood pressure
- Cardiovascular morbidity and mortality
- Treatment costs
- Side effects of medications

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Preliminary evidence was identified using literature considered relevant by the National High Blood Pressure Education Program. A search of more recent literature was conducted on Medline prospectively using the major keywords of: hypertension, human adults, English language, clinical trials, guidelines, and published since 1/1/99. Terms used for specific topic searches within the major key words included: alpha 1 blocker, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonist, beta blockers (selective and non-selective), calcium channel blockers (dihydropyridine and non-dihydropyridine forms), centrally acting alpha-2 agonist, diuretics (thiazide and non-thiazide, loop, potassium-sparing, vasodilator, avoidance (alcohol, stress, tobacco), blood pressure monitoring (ambulatory, home), dietary (caffeine, calcium, garlic, magnesium, onion, potassium, sodium), disease-based management (brain, cardiac, eye, kidney, peripheral vascular), and exercise. Detailed search terms and strategy available upon request from the guideline developer.

The search was conducted in components each keyed to a specific causal link in a formal problem structure (available upon request). The search was supplemented with very recent information available to expert members of the panel, including abstracts from recent meetings and results of clinical trials. Negative trials were specifically sought. The search was a single cycle.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A. Randomized controlled trials
B. Controlled trials, no randomization
C. Observational trials
D. Opinion of expert panel

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the National Guideline Clearinghouse (NGC): The following key points summarize the content of the guideline. Refer to the full text for additional information, including detailed information on dosing, possible side effects, and cost of medications and considerations for pregnant patients. The levels of evidence (A, B, C, D) are repeated at the end of the Major Recommendations field.

Diagnosis

- Although a single, carefully taken blood pressure (BP) reading may predict future cardiovascular risk, this risk is better identified by taking the mean BP level from recordings over several visits.
- Careful calibration of the BP monitor and thorough patient education are essential if home BP monitoring is used.
- If accurate home BP monitoring is not available or desirable, consider ambulatory BP monitoring to confirm the diagnosis for newly suspected hypertensive patients [evidence: B*].

Treatment

- For patients without diabetes or end organ damage, the target of BP therapy is less than 140/90 millimeters mercury (mmHg) [A*].
- For patients with diabetes or end organ damage (e.g. renal insufficiency, retinopathy, congestive heart failure [CHF], coronary artery disease [CAD], PVOD, cerebrovascular disease), aggressive treatment of hypertension (HTN) provides significant improvements in clinical outcomes [A*]. Systolic goals have not been specifically defined. A target systolic blood pressure of 135 mmHg or less [D*] and diastolic BP goal of 80 mmHg or less [B*] is recommended based on trials to date.
- Treatment of systolic blood pressure (SBP) over 160 mmHg is important in reducing cerebrovascular accident (CVA) and congestive heart failure risk.
- Lifestyle modifications to lower BP are important adjuncts to drug therapy [A*].
- The choice of initial drug therapy is not as important as individualizing therapy to achieve effective BP reduction goals (refer to the original guideline document for medication dosage and administration information).
    - Angiotensin converting enzyme (ACE) inhibitors and diuretics are recommended as first-line therapy [A*].
    - ACE inhibitors may decrease cardiovascular (CV) complications in individuals with cardiovascular risk factors, especially diabetes, and should be considered first-line therapy in these individuals [A*].
    - Beta-blockers are considered first-line therapy, and are strongly indicated for patients with coronary artery disease or congestive heart failure, but may not lower BP effectively for elderly patients with systolic hypertension.

    - Alpha-blockers should generally not be used as initial therapy, as increased cardiovascular complications have been demonstrated compared to diuretic therapy [A*].
- Over 50% of individuals require more than monotherapy to achieve BP goals and usage of fixed combination therapy is more effective and cost-effective. Once-a-day medications increase compliance and are preferred.

Definitions:

Levels of Evidence

*Levels of evidence reflect the best available literature in support of an intervention or test:

A. Randomized controlled trials
B. Controlled trials, no randomization
C. Observational trials
D. Opinion of expert panel

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see Major Recommendations).

Conclusions were based on prospective randomized clinical trials if available, to the exclusion of other data; if randomized controlled trials were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improved diagnosis of hypertension
- Improved blood pressure control
- Decreased hypertension-related end-organ damage and consequent morbidity and mortality
- Improved patient involvement in care

Subgroups Most Likely to Benefit:

Patients with risk factors for cardiovascular disease and target organ damage (see original guideline document for list of risk factors)

POTENTIAL HARMS

Thiazide Diuretics

- Increase the frequency of sexual dysfunction in men.
- Cause a short-term increase in low-density lipoprotein (LDL) cholesterol; however, long-term trials have shown minimal change.
- Can have a minimal effect on glycemic control in diabetics.
- Can increase uric acid, related attacks of gout, and dose-dependent hypokalemia.

Beta-blockers

Fatigue and impotence are commonly reported side effects with beta blockers at high doses, but are uncommon side effects at the recommended low doses.

Angiotensin Converting Enzyme (ACE) Inhibitors

- Angioedema is a rare side effect (0.1%) which may be life-threatening and may occur at any point in the treatment.
- All in this class induce cough equally, which may be disabling enough with some patients to result in the need to discontinue the drug; cough occurs more often in women.
- Renal impairment may occur in patients with bilateral renal artery stenosis or unilateral renal artery stenosis with a single kidney.

Angiotensin II Receptor Blockers (ARB)

- Angioedema has been rarely reported with losartan, but has occurred in patients with prior angioedema on ACE inhibitors
- Losartan has a uricosuric effect that is unique compared to others in this class.

Calcium Channel Blocking Agents

- A class side effect is edema formation, usually around the eyes or ankles, as a consequence of excessive arteriolar or pre-capillary vasodilation, and is more pronounced in the second generation dihydropyridine agents.
- Verapamil has more pronounced bradycardia effects and often results in constipation.

Peripheral Alpha Blockers

Peripheral alpha blockers are more likely to result in orthostatic hypotension. The shorter acting agents (e.g. prazosin and terazosin) are more likely to exhibit a first dose effect of syncope due to orthostatic hypotension, which may also occur in the first few days of therapy or with rapid increased dosages.

Centrally-acting Alpha-2 Agonists

Dry mouth and sedation are common; may induce bradycardia

CONTRAINDICATIONS

CONTRAINDICATIONS

- All angiotensin converting enzyme (ACE) inhibitors and angiotensin II receptor antagonists (ARB) are contraindicated in pregnancy.
- All ACE inhibitors and ARB are relatively contraindicated in patients with bilateral or equivalent renal artery stenosis.
- Calcium channel blocking agents should be avoided as a single agent for patients with microalbuminuria, as they will worsen protein loss, but may be used in combination with ARB or ACE inhibitors. Diltiazem and verapamil should also be avoided in the first 24 to 48 hours of a myocardial infarction.
- It is now recommended not to use peripheral alpha blockers as first-line therapy in patients over 50 years of age; however, the combination therapy using this class may be considered, if necessary, to control the blood pressure.
- Thiazide diuretics are not preferred in individuals with renal impairment (serum creatinine $\geq$ 2.5 mg/dl).
- Beta-blockers, non-dihydropyridine calcium channel blockers, and alpha-2 agonists are relatively contraindicated in patients with bradycardia and heart block.

Refer to Table 1 in the original guideline document for additional contraindications and cautions in selecting antihypertensive medications for patients with coexisting conditions.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific clinical procedure or treatment must be made by the physician in light of the circumstances presented by the patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

University of Michigan Health System. Essential hypertension. Ann Arbor (MI): University of Michigan Health System; 2002 Aug. 14 p. [7 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1997 (revised 2002 Aug)

GUIDELINE DEVELOPER(S)

University of Michigan Health System - Academic Institution

SOURCE(S) OF FUNDING

University of Michigan Health System

GUIDELINE COMMITTEE

Hypertension Guideline Team

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Team Leader: Steven Yarows, MD

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Guidelines Oversight Team: Connie Standiford, MD; Lee Green, MD; Van Harrison, PhD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

The University of Michigan Health System endorses the Guidelines of the Association of American Medical Colleges and the Standards of the Accreditation Council for Continuing Medical Education that the individuals who present educational activities disclose significant relationships with commercial companies whose products or services are discussed. Disclosure of a relationship is not intended to suggest bias in the information presented, but is made to provide readers with information that might be of potential importance to their evaluation of the information.

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GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Essential hypertension. Guidelines for clinical care. Ann Arbor (Michigan): University of Michigan Health System, 1997.

A revision of this guideline will be available in 2003.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the University of Michigan Health System Web site.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on March 19, 2003. The information was verified by the guideline developer on April 23, 2003.

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